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NEW FRESH-WATER FISHES FROM WESTERN ECUADOR.

BY HENRY W. FOWLER.

A small collection of fishes, secured in the affluents of the Chimbo River near Bucay, in the Province of Guayas, Ecuador, in July of 1911, was recently submitted to me for study by Mr. S. N. Rhoads. At present this collection is placed on deposit in the Academy. As the region in question presents some interesting hydrographic features, Mr. Rhoads kindly contributes the following notes, gathered from his recent explorations in the country where he obtained the collection.

"The Rio Chimbo, joining the Rio Chanchan several miles below Bucay, flows almost directly southward from its source in the western foothills of Mount Chimborazo for a distance of about 50 miles. It is more practically isolated in a faunal sense from the sources of all the other river systems of Ecuador flowing into the Pacific than any other watercourse of its size in that country. This is due to its being hemmed in both east and west by the lofty parallel ranges of the Main or Central Cordilleras and that of the Pacific system of mountains which goes by the name of the Western Cordilleras. Until it joins the Chanchan, its waters have no alternative but to continue their precipitous and turbulent course due south as in a mighty trough, but there, having reached more level and less elevated country, its course naturally deflects almost at right angles and makes a short cut for the ocean via the mighty Guayas. The Chimbo is characteristic of all those rivers of western Ecuador which owe their origin, as well as their perpetuity during the dry season, to the snow- and glacier-fed springs of the great peaks of the Andean system which rise to an elevation of 15,000 to 20,000 feet above sea level. The greater part of the lofty country drained by these rivers is extremely precipitous, almost denuded of forest growth and trampled by cattle. The soil is filled with boulders and pebbles, and the rock- and mud-encumbered river channels are continually changing base with every sudden rise of the water. Couple this with a continuous gradient of the river bed of 5 to 15 and even 20 per cent. and one begins to understand why only one species of fish can exist in these waters at elevations of over 3,000 feet. Even below this there are very few species to be found in the main channel until the upper edge of the lowland terraces appears, at about 1,000 feet above the sea, and even here the majority of the fish fauna confines itself to the smaller creeks and rivulets of clear water which are fed by the perennial springs of the densely wooded foothills and jungles of the 'Tierra Caliente.' Such conditions necessarily develop these tributary streams of the foothills into isolated fish faunas of the most restricted local character, as it is practically impossible for the majority of those fish which thrive here in such great profusion to live in the turbid and rushing waters of the main river, which, under more pacific conditions, would be a means of intercourse rather than a barrier. For this reason we may expect to find the most varied and puzzling faunal conditions in the ichthyology of the west Andean foothills when systematic collections have been made. As yet there is a vast area of this character in Colombia and Ecuador which has been almost untouched by the scientific collector of fishes. All the fish described in this paper, with one or two exceptions, were dynamited by railroad men in the larger pools of clear-water streams flowing into the Chimbo River, about 2 miles from Bucay. These streams are for the most part deeply shaded by forests and enclosed by high and rocky banks, their sandy or gravelly beds much strewn by boulders and in many places their quiet reaches are broken by shallow rapids, as in our larger trout streams of the Alleghany Mountains. Some of a larger species of Characid than any here described, weighing about 2 to $2\frac{1}{2}$ pounds, were secured with the others, but considered by their captors too valuable as food to be pickled in the interests of science! The flesh of these was good, but the bones too omnipresent for comfort."

CHARACIDÆ.

PROCHILODINÆ.

Prochilodus stigmaturus sp. nov. Fig. 1.

Head $3\frac{3}{5}$; depth $3\frac{1}{4}$; D. iii, 9; A. iii, 7; P. i, 13; V. i, 8; scales in l. l. 38 to caudal base, and 3 more on latter; 9 scales above l. l. to dorsal origin; 6 scales below l. l. to ventral origin; 6 scales below l. l. to anal origin; 17 predorsal scales; head width $1\frac{9}{10}$ its length; head depth at occiput $1\frac{2}{5}$; snout 3; eye $4\frac{1}{3}$; maxillary $4\frac{2}{5}$; mouth width $4\frac{1}{6}$; interorbital $2\frac{1}{2}$; second branched dorsal ray $1\frac{2}{7}$; first branched anal ray $1\frac{9}{10}$; least depth of caudal peduncle $2\frac{1}{10}$; lower caudal lobe $1\frac{1}{8}$; pectoral $1\frac{1}{2}$; ventral $1\frac{3}{5}$.

Body elongate, compressed, contour fusiform, and deepest at dorsal origin. Upper profile convex, bulging slightly more anteriorly, though back not elevated conspicuously. Lower profile rather more evenly convex. Edges of body all evenly convex, without keels. Caudal peduncle compressed, moderate, length about $\frac{7}{8}$ of least depth.

Head small, compressed, sides flattened and not constricted above or below, though both of latter surfaces evenly convex. Profiles similar, nearly straight. Snout broad, obtuse, convex both over surface and in profile, produced well beyond mandible tip, and length about ⅞ of basal width. Eye nearly circular, but little elevated, and centre well before middle in head length. Eyelid narrow. Mouth broad, and commissure short in profile, horizontal largely. When opened, mouth quite broad, directed downwards, and jaws rather firm and but moderately strong, apparently not disk-like. Lips thin and scarcely developed, edge of upper rather trenchant and lower rather broad. Edge of each lip with a row of numerous minute papillæ its whole extent, and apparently all sessile. No inner series in either jaw. Mouth aperture small, as seen in front with a medium notch in upper jaw into which symphysis of mandible fits. Also each ramus of mandible swollen a little on its upper edge, this fitting in a corresponding concavity also in side of upper jaw. Upper and lower buccal folds moderately broad in mouth. Tongue small, fleshy, not free. Mandible short, and rami well elevated inside mouth, articulated below hind nostril. Nostrils moderate, close together, anterior circular and about midway in snout, and posterior exposed in crescent close behind. Interorbital space broadly convex. Preorbital about 1½ in eye. Infraorbital narrow, about equals eye. Postorbital width 1⅘ in eye. Preorbital also a little swollen, with cavity below, into which maxillary fits when closed, its hind edge then about opposite nasal frenum. Opercle width about 1¾ its depth and smooth like other bones of head. Cutaneous opercular flap moderately broad behind.

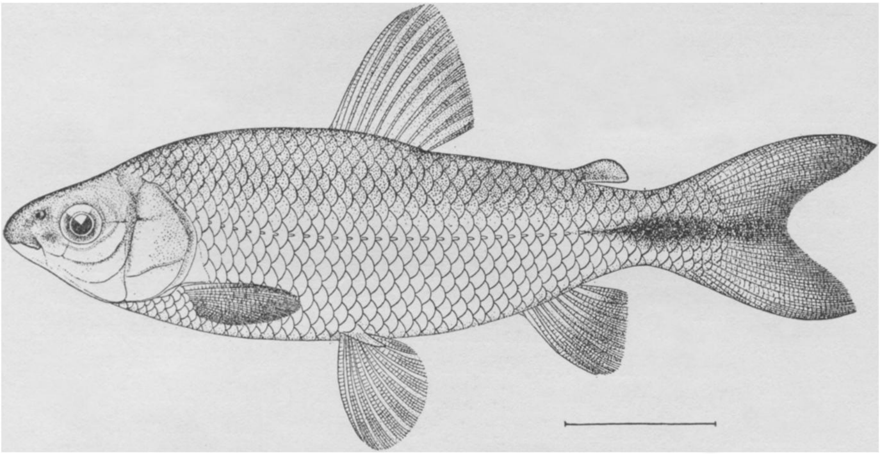

Fig. 1.—*Prochilodus stigmaturus* Fowler. Type.

Gill-opening extends forward about opposite hind edge of eye. Rakers none. Filaments of inner series a little longer than those in outer, or about equal to $\frac{7}{8}$ of eye-diameter. Isthmus broad. Inner upper portion of gill-opening with many small papillæ. Branchiostegals 4, strong, graduated slightly from innermost to outermost, all straight and rather long.

Scales large, of more or less even size, disposed in even longitudinal series parallel with l. l., well exposed, and each one with as many as a dozen rather irregular radiating striæ in some cases, usually less. Margin of each scale entire, evenly convex, not rough. Scales a little small on breast. Caudal base with most of scales scarcely smaller than elsewhere on body, other fins naked. Head naked. Pointed scaly flap in ventral axil $2\frac{1}{2}$ in fin. Apparently no median predorsal keel, though just traces of a faint one behind dorsal fin. Though belly and chest rounded convexly, a very faint ridge or keel extends from below lower pectoral base nearly to ventral axil. Postventral and postanal regions entirely evenly convex. L. l. complete, begins at shoulder and nearly follows median axis to median caudal base. Tubes simple, at first little exposed, and after ninth extending at least half-way over scale exposures.

Dorsal origin a little nearer snout tip than caudal base, fin moderate, second branched ray longest, and when depressed reaches $1\frac{3}{7}$ to adipose fin origin. Anal smaller than dorsal, margin of fin straight its origin a little nearer caudal base than ventral origin, and depressed fin $1\frac{1}{2}$ to caudal base. Adipose fin rather large, length about equals snout, its base over bases of last anal rays. Caudal rather large, rays broadly expanded, fin deeply emarginated, and lower lobe a little shorter. Pectoral moderate, upper rays longest and fin $1\frac{2}{7}$ to ventral origin. Latter about opposite first branched dorsal ray base, second and third branched rays longest, and fin $1\frac{2}{5}$ to anal origin. Vent close in front of anal.

Color in alcohol, when fresh, largely pale slaty above, sides and below silvery-white. In some lights back with an olivaceous tint, in others largely grayish. Median line of back largely with dusky tinge. Head dusky to olivaceous or grayish above, sides with some brassy tinges, and lower surface whitish. Snout largely brownish, even to edge of upper lip. Mandible pale or whitish. Iris silvery-white. Dorsal slaty-dusky, deeper towards edge of fin, immaculate. Caudal paler than dorsal, but large blackish blotch on caudal peduncle side at terminal portion of lateral line continued back over median rays to their tips, though paler. Inner submarginal portions of caudal lobes very indistinctly mottled with pale gray spots, or leaving incomplete short wavy lines of darker color somewhat transversely over these portions of fin-rays. Adipose fin pale or dull olive-brown. Pectoral and ventral pale brownish to whitish, former with median upper portion a little grayish or darker. Anal pale basally, though greater outer or distal portion quite dusky.

Length 5½ inches.

Type, No. 1. Collection, S. N. Rhoads. Affluent of the Chimbo River near Bucay, Province of Guayas, Ecuador. July, 1911.

Only a single example of this species, described above, was obtained. It differs from *Prochilodus humeralis* Günther[1] chiefly in coloration, that species being marked with a black shoulder spot on the fourth to sixth scales of the lateral line and the dorsal with blackish dots posteriorly, though the other fins and base of the caudal are immaculate.

Other species from the eastern drainage of South America which I have examined are, of course, entirely different in coloration, viz.: *P. steindachneri* Fowler, *P. ortonianus* Cope, *P. cephalotes* Cope, *P. teraponura* Fowler and *P. amazonensis* Fowler.

(*Στὶγμα*, blotch; *οὐρα*, tail; with reference to the dark caudal blotch.)

RHOADSINÆ.

Preventral region rounded, without keel. Dentition perfected. Jaws peculiar, well back, and long mandible articulated below hind edge of eye. Dorsal and anal rays elongated. Adipose fin present.

I have framed this subfamily for the single aberrent genus described below. It is remarkable for the constriction of the jaws, somewhat suggestive of the salmonoid *Plecoglossus*. Its affinities are likely near the *Tetragonopterinæ.*

RHOADSIA gen. nov.

Type *Rhoadsia altipinna* sp. nov.

Body deep, compressed. Belly rounded. Mouth cleft large, deep. Front jaw teeth in adult largely uniserial, strong, compressed, each with large pointed median denticle and two graduated smaller denticles each side, of which outer or lower smaller. Sometimes three or four external short conic teeth on upper lip in adult, absent in young. In young anterior jaw teeth all broader, with more uniform cutting-edge, as denticles all more on a line and median denticle but slightly enlarged. Adult with a single series of conic maxillary and lateral mandibular teeth, absent in young. Maxillary long and slender in adult, much shorter in young. Mandible articulated well posteriorly, or below hind eye edge in adult, and in young articulated a little anterior. Nostrils close together, separated by valve only. Gill-opening wide, membranes free from isthmus and largely separated. Rakers lanceolate. Scales all cycloid, well exposed, parallel with l. l. above and below, though latter also oblique. Anal with narrow scaly area basally, and scales on caudal base not extending far out on fin. L. l. incomplete, not extending beyond dorsal base. Dorsal median, base short, and rays greatly elevated. Anal begins after dorsal base, its own base long, and front rays elevated. Caudal well forked. Pectoral almost reaches ventral. Ventral inserted before dorsal, reaches anal.

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[1] *Proc. Z. S. London,* 1859, p. 419. *Western Andes of Ecuador.*

A single species, small fishes in the mountain streams of western Ecuador.

(Named for Mr. Samuel N. Rhoads, in slight recognition of his ability as a naturalist and explorer.)

Rhoadsia altipinna sp. nov. Fig. 2.

Head $3\frac{3}{5}$; depth $2\frac{1}{2}$; D. ii, 9; A. iv, 24; P. i, 12; V. i, 7; scales in l. l. 38 to caudal base, of which 16 anteriorly with tubes; 4 scales in horizontal series medianly on caudal base; 9 scales above l. l. to dorsal origin; 11 scales below l. l. to ventral origin; 21 scales in vertical series between anal origin and last dorsal ray base; 22 predorsal scales; head width 2 in its length; head depth at occiput $1\frac{1}{6}$; snout $2\frac{3}{4}$; eye $4\frac{2}{5}$; maxillary $1\frac{1}{2}$; mandible $1\frac{3}{5}$; interorbital $2\frac{2}{5}$; dorsal base $1\frac{7}{8}$; least depth of caudal peduncle $2\frac{2}{5}$; adipose fin length 3; fourth branched anal ray $1\frac{1}{8}$; pectoral $1\frac{2}{5}$; ventral $1\frac{2}{7}$.

Body deep, well compressed, form elongately ovoid, and lower profile a little more evenly convex than upper. Owing to slope down posteriorly of dorsal base upper profile appears a little more bulging anteriorly as compared with lower profile. Greatest body depth at dorsal origin. Predorsal region trenchant, and postdorsal region narrowly convex. Behind adipose fin, just before and over anterior rudimentary caudal rays edge becomes trenchant. Breast and preventral region narrowly constricted, though with convex edge. Postventral region narrowly constricted, though scarcely trenchant. Postanal region similar, except edge becoming slightly trenchant over anterior rudimentary rays. Caudal peduncle well compressed, and its least depth about equals its length.

Head moderate, well compressed, flattened sides slightly approximated below and upper and lower surfaces evenly convex. Profiles similarly inclined, but very slightly convex. Snout moderately long, protruding slightly below closed mandible tip, length about $\frac{7}{8}$ its basal width, and surface evenly convex. Eye slightly ellipsoid, its centre level with snout tip and a little before middle in head length. Pupil slightly ellipsoid in vertical. Eyelid very narrow, free, not adipose-like. Mouth peculiar, large, and commissure very deep, extending back not quite opposite front pupil edge, though beyond front eye margin. Maxillary straight, of rather narrow and uniform width, well inclined back till its tip opposite hind eye edge, and most its whole length free from the corresponding straight infraorbital edge. Mandible long, rami incised or emarginated in front, giving a chisel-like appearance. Rami also attain their greatest height anteriorly or opposite a corresponding notch in front of maxillary, after which they are continued back to their articulations of uniform height. A single series of compressed sharp teeth form cutting edge in front of upper jaw, consisting of 6 teeth each side. Each tooth with a median and slightly enlarged pointed cusp followed by 2 smaller ones each side, latter usually subequal. Front

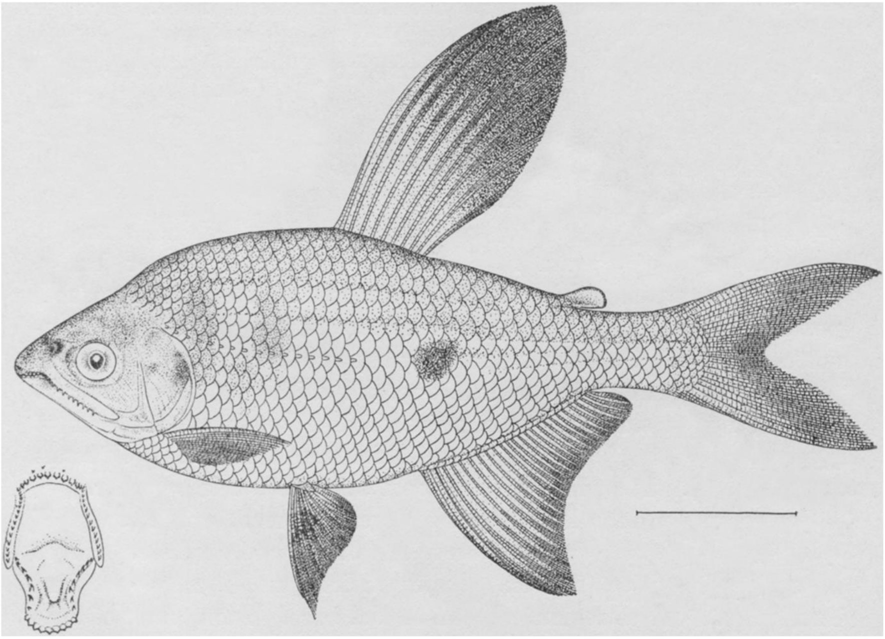

Fig. 2.—*Rhoadsia altipinna* Fowler. Type.

or incised portion of mandible with a series of somewhat similar teeth, about 5 each side, all rather broader than upper teeth and contour of cutting-edge of each tooth less triangular. A single series of large and erect conic canines along maxillary edge well down near its distal extremity, and at first a little closer together. Straight lateral mandibular edges with a single series of conic canines each side, first few slope forward, after which they all incine well back, most are also well curved. In both jaws the dentition is continuous anteriorly, as the premaxillary and the maxillary, and the anterior and posterior mandibular elements. Lips firm, upper with several short conic denticles, and lower conceals lower lateral teeth. Tongue thick, fleshy, rather narrow and not free. Snout tip extends a little before mandible tip. Nostrils moderate, together, and frenum about last third in snout. Interorbital well convex. Fontanel narrow, extends back from opposite front eye edge to occipital crest. Preorbital rim narrow, its width about half of eye. Greatest diameter of postero-infraorbital width equals eye. Postorbital width $1\frac{4}{7}$ in eye. Posterior edge of preopercle inclined a little behind, straight, and with a distinct and rather narrow triangular corner below. Opercle narrow, its width about $2\frac{1}{6}$ in its depth. Preopercle surface, postero-infraorbital and opercle with some rather coarse and inconspicuous striæ. Cutaneous opercular flap moderately broad behind.

Gill-opening extends forward opposite middle of eye. Rakers 8 + 14, rather slender, weak, pointed, and longest about half of filaments. Latter about $1\frac{1}{4}$ in eye. No pseudobranchiæ. Isthmus rather broad. Branchiostegals strong, subequal, 4 in number.

Scales moderately large, cycloid, well exposed, and largely of uniform size. Radiating striæ on scales all fine and obsolete. Edges of scales all entire, convex. Scales a little small on breast and anterior preventral region, also on caudal base. Along base of anal anteriorly row of low scales. No axillary scaly pectoral flap, and that of ventral about 5 in fin. Scales above and below l. l., and its course in series parallel. Below this axis and posteriorly they slope slightly obliquely to anal base. Fins except as mentioned above, together with head, naked. L. l. incomplete, extends but little beyond dorsal origin, its short course nearly horizontal from shoulder. Tubes simple, exposed until some extend over first half of scale exposures.

Dorsal origin about midway in vertical between snout tip and caudal base, almost all rays elongated with slender tips so depressed fin extends back to caudal base, though antero-median rays longest.

Adipose fin moderate, inserted about midway between last dorsal ray base and caudal base, fin 2¼ to latter. Anal inserted opposite last dorsal ray base, anterior rays elongated and second branched one longest, it extending about 1¼ to caudal base. Caudal deeply forked, lobes rather slender, pointed, tips damaged and apparently equal, fin also apparently a little longer than head length. Pectoral rather small, upper rays longest, fin a little falcate, not quite reaching ventral. Ventral origin slightly before dorsal, fin pointed, depressible back a little beyond anal origin. Vent midway between ventral and anal origins.

Color when fresh in alcohol largely pale umber-brown on back and upper surface, edges of scales darker. Median dorsal line also somewhat dusky. Sides and lower surface of body pale to whitish, and all more or less overshot with dull silvery, pale lilac in some lights. Upper surface of head brownish like back, sides and lower surface pale. Opercle with silvery-white reflections, and a dull indigo-black blotch level with eye on its upper portion. Snout entirely brownish to edge of upper lip, and mandible decidedly paler like whole of lower jaw. Iris silvery-white, with grayish tinge above. Transversely on back 2 broad deeper brown bands than body-color, first a little narrower and at first third in predorsal region, second at second third of same. An indistinct or nebulous pale brown blotch at beginning of l. l., followed by an indistinct pale gilt area to another indistinct brownish blotch within limits of second dark transverse band. Behind l. l., though on same level, opposite anal origin a distinct large rounded spot of dusky or blackish, this a little larger than eye. Along sides, following median axis, a streak of underlaid and rather dull silvery, though posteriorly becoming quite narrowed, or about ⅖ of eye-diameter. Dorsal pale or grayish basally, becoming rather dusky on outer portions. Adipose fin pale grayish, edge narrowly dusky. Anal largely pale grayish, a little darker marginally, and only front edge of long anterior lobe slightly dusky. Caudal largely grayish like other fins, hind edges a trifle dusky. Pectoral pale brownish, distally a little darker brown. Ventral grayish basally, distal end of longest rays dusky slate-color. Peritoneum blackish.

Length 5 inches (caudal tips damaged).

Type, No. 2. Collection, S. N. Rhoads. Affluent of the Chimbo River near Bucay, Province of Guayas, Ecuador. July, 1911.

Also Nos. 3 to 6, paratypes, same data. Head 3½ to 3⅔; depth 2⅖ to 2½; D. III, 9; A. usually IV, 27, sometimes IV, 25 or IV, 28;

scales in median lateral series 38 to caudal base, and 4 more on latter, sometimes 3; 10 scales above l. l. to dorsal origin; 8 or 9 scales below l. l. to ventral origin; usually 20 scales, sometimes 19, between anal origin and last dorsal ray base; usually 20 predorsal scales, sometimes 21; usually 17 l. l. tubes, sometimes 15 or 16; snout $2\frac{4}{7}$ to $3\frac{1}{2}$ in head; eye $2\frac{3}{4}$ to $4\frac{1}{6}$; maxillary $1\frac{3}{5}$ to 2; interorbital $2\frac{2}{5}$ to 3; pectoral $1\frac{1}{4}$ to $1\frac{1}{3}$; ventral $1\frac{1}{3}$ to $1\frac{4}{7}$; length $2\frac{1}{2}$ to $4\frac{15}{16}$ inches.

Variation with age, as well as individually, is quite noticeable. In the type the right upper teeth forming the cutting edge are all more or less conic and with only obsolete cusps. The other examples have them symmetrically developed, and in the young examples all the cusps are all more on a uniform plane or line in both jaws. Small examples also have no external conic denticles on the upper lip. The smallest paratype also has no maxillary or lateral mandibular teeth, only the cuspidate anterior teeth being developed, and all the simple conic teeth apparently only appearing with age. The young also have a large eye, a much shorter maxillary, which only reaches back about opposite front edge of pupil, the articulation of the mandible before the hind pupil edge, predorsal scales much smaller than the others, the depressed dorsal fin not reaching adipose fin origin, and without traces of the dark predorsal bands. With advancing age a few conic teeth appear on the maxillary and lateral elevated portions of the mandibular rami, though only in the large examples is this bone elongated and well toothed.

The accompanying figure has the tail ends represented as restored, and the cut illustrating the dentition shows the left upper teeth as symmetrical.

(*Altus*, high; *pinna*, fin; with reference to the elevated dorsal of the adult.)

TETRAGONOPTERINÆ.

Brycon scapularis sp. nov. Fig. 3.

Head $3\frac{1}{5}$; depth 3; D. III, 9; A. IV, 25, I; P. I, 12; V. I, 7; scales in l. l. 51 to caudal base and 4 more on latter; 10 scales above l. l. to dorsal origin; 5 scales below l. l. to ventral origin; 6 scales below l. l. to anal origin; 22 predorsal scales; head width $2\frac{1}{5}$ in its length; head depth at occiput $1\frac{1}{3}$; snout 4; eye $3\frac{1}{4}$; maxillary $2\frac{1}{4}$; nterorbital $3\frac{2}{5}$; mandible $2\frac{1}{8}$; first branched dorsal ray $1\frac{1}{2}$; least depth of caudal peduncle $3\frac{1}{4}$; first branched anal ray $2\frac{1}{8}$; pectoral $1\frac{1}{3}$; ventral $1\frac{7}{8}$.

Body well compressed, contour rather evenly ellipsoid, greatest depth at dorsal origin, edges all convexly rounded or with only slight median preventral ridge or keel. Postventral region rather constricted. Caudal peduncle well compressed, its least depth about 1⅕ its length.

Head well compressed, flattened sides slightly constricted below, upper and lower surfaces rather evenly convex, profiles similarly inclined and slightly convex anteriorly. Snout a little convex in profile, surface well convex, length about ¾ its basal width. Eye a trifle ellipsoid, rather high, its centre about first third in head. Eyelid narrow and thin. Pupil vertically ellipsoid. Maxillary well inclined, extends till below front pupil edge, and distally expanded till about 3⅕ in eye. Jaws strong, firm, equal. Upper lip tough, firm, moderate. Lower lip thick, free in front, and rather fleshy. Mouth moderate, commissure rather short, horizontal. Premaxillary teeth triserial, mostly with an enlarged median denticle and a rather obtuse small denticle or cusp each side basally, former much in contrast with latter. Posterior premaxillary teeth similar, only broader and a little larger. All premaxillary teeth rather thick, with entire edges, surfaces convex, strong and firm. Maxillary with a series of rather small close-set conic short teeth over about first or upper ⅔ of its lower edge, these also all more or less concealed by membrane over bone. Mandibular teeth uniserial, first 3 each side of symphysis enlarged, largest of all teeth, and laterally on each mandibular ramus those following quickly decreasing in size, and some becoming minute, so that dentition does not extend more than

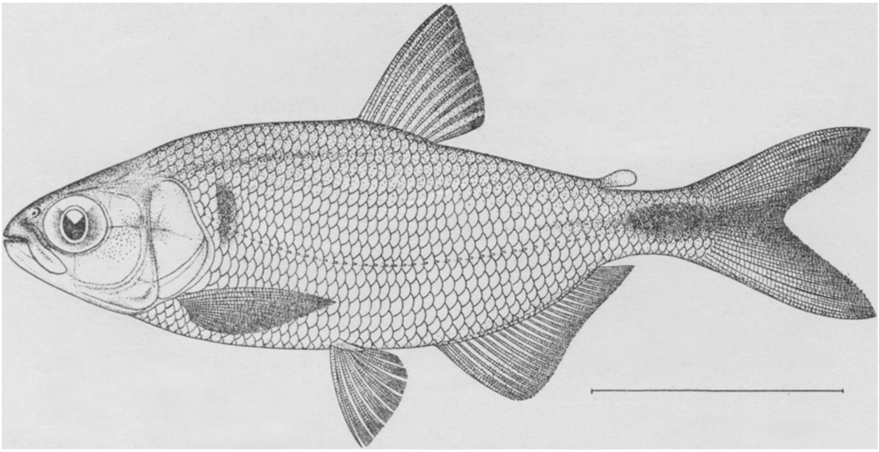

Fig. 3.—*Brycon scapularis* Fowler. Type.

first $\frac{2}{3}$ of mandible length. Mandibular teeth strong, thick-rooted, surfaces convex, edges entire, each with an enlarged median cusp, and one or two smaller basal cusps on each side, all of which sharp and triangular. Two small conic canines close inside outer symphyseal teeth. No other teeth in mouth. Buccal membranes well developed, upper especially broad. Tongue thick, fleshy, rather depressed above and scarcely free in front. Mandible strong and rami little elevated in mouth. Nostrils rather large, close together, anterior simple pore and posterior exposed in crescent, close before upper front eye edge or about last fourth in snout. Interorbital broadly convex. Preorbital quite narrow and maxillary slipping below its lower edge. Antero-infraorbital broadly triangular, small. Postero-infraorbital large, its length equals snout and half of eye. Postorbital small, its width $1\frac{2}{3}$ in eye. Opercle width $2\frac{1}{4}$ its depth. Preopercular edge nearly vertical, but slightly inclined behind, and its lower corner rounded. Bones of head all smooth, without striæ. Cutaneous edge of gill-opening moderately broad.

Gill-opening extends forward about opposite hind pupil edge. Rakers about 9 + 13, lanceolate, slender, pointed, a little less than longest filaments. Filaments about $1\frac{1}{2}$ in eye. No pseudobranchiæ. Isthmus narrow, surface rather rounded, and membranes form slight free fold anteriorly for short space. Branchiostegals 4, strong, and subequal.

Scales cycloid, all rather more or less narrowly imbricated, disposed in series parallel with l. l., and becoming but a trifle smaller along edges of body and breast. Many as 6 radiating striæ visible on scale exposure and usually well marked. Caudal base covered with scales but little smaller than those on rest of body. Slight pit, formed by membrane above, in pectoral axilla. Axillary ventral scaly flap pointed, slender, free, about 3 in fin. Anal base with low sheath of thin small scales. Scales passing over all body edges. L. l. complete, begins sloping down from shoulder in even curve till about opposite ventral origin, where near lowest third in body depth, and then gradually slopes up, low along caudal peduncle side at first to middle of caudal base. Tubes all simple, short and but little exposed.

Dorsal origin about midway between hind nostril and caudal base, first branched and third simple ray longest and subequal, depressed back far as tips of any others, fin $1\frac{2}{3}$ to adipose fin origin. Adipose fin moderate, $1\frac{2}{5}$ in eye, origin about midway between depressed dorsal tip and caudal base, fin 2 to latter. Caudal (damaged) well forked, lobes apparently pointed and slender, also likely equal ?, and fin about equal to head in length ?. Anal origin about opposite last dorsal ray base, first branched ray longest, though second and third branched and fourth simple subequal, with anterior rays of fins thus much longer than others, and last fin ray about half way to caudal base. Pectoral long, rather slender, upper rays longest, and fin extends a little beyond ventral origin. Latter inserted before dorsal, though nearer anal origin than pectoral, and depressed fin reaching anal origin. Vent close before anal.

Color in alcohol largely brownish or dull olivaceous, with lilac tinge on back, sides and lower surface brilliant silvery-white. In some lights body more or less reflected greenish or lilac. Head above olivaceous-brown, color including upper lip and upper portion of maxillary, sides and lower surface, silvery-white, mandible pale. Iris silver-gray, varied, with narrow golden circle around pupil. Inside gill-openings pale. A short, narrow and rather dull vertical leaden streak opposite eye after and superior to third scale in l. l. Caudal peduncle, at caudal base, with a large dusky blotch, equal to the eye in extent, extending out on caudal base, and reflected back to include median caudal rays as a dusky streak, though latter a little paler than blotch. Dorsal grayish, membranes medianly tinged with dusky. Caudal grayish, edges of fin all slightly dusky. Other fins pale or whitish, membranes of anal grayish distally. Peritoneum rather dusky.

Length $3\frac{5}{16}$ inches (caudal tips damaged).

Type, No. 7. Collection of S. N. Rhoads. Affluent of the Chimbo River near Bucay, Province of Guayas, Ecuador. July, 1911.

In the accompanying figure I have restored the caudal fin ends.

This species differs from *Brycon atrocaudatus* (Kner)[2] in the dark humeral blotch. If, as Boulenger suggests,[3] *B. moorei* Steindachner[4] is identical with *B. atrocaudatus* (Kner), *B. scapularis* further differs in the absence of an inner lateral mandibular series of simple or conic teeth. Steindachner says of *B. moorei* that the dark humeral blotch is indistinct. *B. scapularis* differs also from all the species mentioned in its vertically ellipsoid pupil.

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[2] *Chalceus atrocaudatus* Kner, *Sitz. Ak. Münch.*, II, 1863, p. 227. *Western Andes of Ecuador.*

—— Kner and Steindachner, *Abh. Kön. Bayer. Ak. Wiss.*, X, 1870, p. 44, Pl. 4, fig. 3 (type).

[3] *Brycon atricaudatus* Boulenger, *Boll. Mus. Z. Anat. Torino*, XIII, No. 329, 1898, p. 3. Paramba, in Rio Mira.

[4] *Denks. Ak. Wiss. Wien*, XXXIX, 1879, p. 58, Pl. 5, figs. 2, 2*a*, 2*b*. *Magdalena River.*

(*Scapula,* shoulder, referring to the shoulder-spot.)

Astyanax notemigonoides sp. nov. Fig. 4.

Head 4; depth $2\frac{7}{8}$; D. III, 9; A. IV, 37, I; P. I, 13; V. I, 7; scales 45 in l. l. to caudal base, and about 4 ? more on latter (squamation slightly injured); 9 scales above l. l. to dorsal origin; 7' scales below l. l. to ventral origin; 8 scales below l. l. to anal origin; 17 predorsal scales; head width 2 in its length; head depth at occiput $1\frac{1}{10}$; mandible $2\frac{2}{3}$; first branched dorsal ray 1; first branched anal ray $1\frac{1}{2}$; least depth of caudal peduncle $2\frac{1}{4}$; pectoral $1\frac{1}{10}$; ventral $1\frac{3}{5}$; snout 4 in head measured from upper jaw tip; eye 3; maxillary $2\frac{3}{4}$; interorbital $3\frac{1}{10}$.

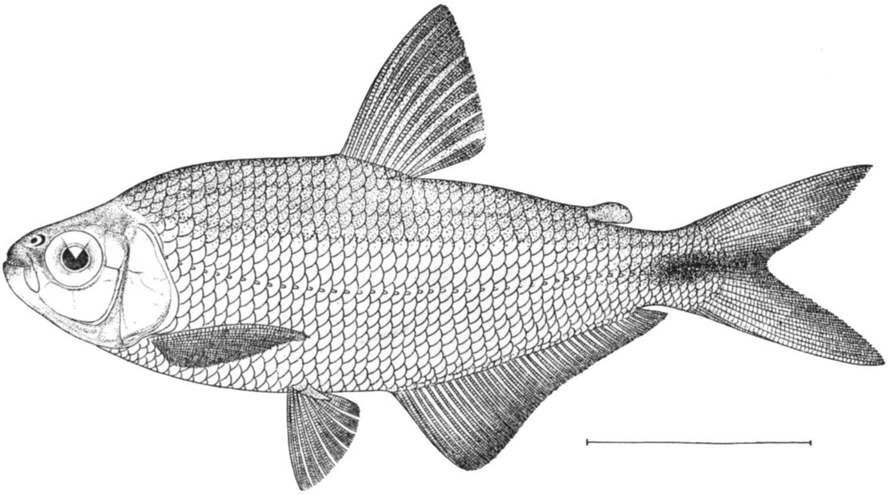

Fig. 4.—*Astyanax notemigonoides* Fowler. Type.

Body well compressed, lower profile deeper and more evenly convex than upper, greatest depth at dorsal origin. Predorsal region slightly trenchant with obsolete median keel. Postdorsal region convexly rounded. Preventral region with slight median keel, becomes obsolete and region flattened immediately before ventral bases. Postventral slightly trenchant with median keel. Postanal region convexly rounded. Caudal peduncle short, well compressed, length about $\frac{2}{3}$ least depth.

Head moderate, well compressed, flattened sides becoming a little constricted below, upper and lower surfaces convex, upper profile much less inclined than lower, at first convex and then a little concave just before occiput. Lower profile slightly convex. Snout short, convex over surface and in profile, its length about $\frac{3}{5}$ basal width. Eye large, circular, rather high, its centre about first $\frac{2}{5}$ in head. Pupil circular. Eyelid very narrow, thin. Mouth small, moderately wide and commissure short and nearly horizontal. Upper lip firm, tough, not free. Lower lip thick, free and rather broad. Premaxillary teeth biserial, rather irregular, strong, broadly triangular, somewhat compressed with each face convex, tricuspid, with median cusp enlarged and lateral cusp each side basally quite broad. Maxillary with 3 minute teeth on its lower edge anteriorly inside upper jaw. Mandibular teeth with symphyseal pair largest, others graduated back soon, so that dentition only extends over anterior half of mandible. Anterior mandibular teeth tricuspid, median cusp much largest, bases strong, surfaces convex and edges entire. Only first 4 mandibular teeth each side at all large. No other teeth in mouth. Buccal folds broad, especially upper. Tongue thick, fleshy, rather oblong, rounded and not free in front. Maxillary rather small, narrow or width about 4 in eye, inclined vertically, and scarcely extends beyond eye front. Mandible strong, powerful, protrudes in front slightly beyond upper jaw tip, rami but little elevated in mouth, and articulation taking place below front edge of eye. Nostrils together, close before upper front eye edge, anterior simple round pore, and posterior exposed in crescent. Interorbital space evenly convex. Preorbital narrow, width about equals maxillary width, and maxillary slips below lower edge anteriorly. Infraorbital quite large, length greater than eye, and covering most of cheek. Postorbital rather narrow, width about $2\frac{1}{4}$ in eye. Opercle narrow, width $2\frac{2}{3}$ in its depth. Hind preopercle edge nearly straight and sloping a little forward. Cutaneous flap along opercular edge rather broad.

Gill-opening forward well before front pupil edge, though not quite opposite front edge of eye. Rakers about 10 + 13, rather weak, lanceolate, sharp-pointed, and longest about $1\frac{1}{2}$ in filaments. Filaments about 2 in eye. No pseudobranchiæ. Gill-membranes well separated, forming a short free fold over narrowly constricted isthmus anteriorly. Branchiostegals 4, strong and nearly subequal.

Scales moderate, rather narrowly imbricated, disposed in longitudinal series parallel with l. l., sometimes each with as many as 12 radiating striæ, and mostly of more or less uniform size. Along edges of body and on base of caudal scales a little smaller than others.

A narrow area of small scales all along anal base, though best developed anteriorly. In other respects all fins, together with head, naked. Squamation passing completely over all edges of body. No axillary pectoral scaly flap, though that of ventral pointed, narrow, free and about 2⅖ in fin. L. l. complete, moderately decurved till a little below median axis of body and then continued up a little low along sides of caudal peduncle to median caudal base. Tubes simple, at first little exposed and at most not extending more than half-way in exposures of scales.

Dorsal origin about midway between snout tip and caudal base, first branched ray longest, second branched and third simple rays subequal, and depressed fin a trifle over half way to caudal base. Adipose dorsal origin a trifle behind last third in space between dorsal origin and caudal base, fin nearly half way to latter. Anal base long, straight, origin about opposite seventh dorsal ray base, first branched ray longest with fourth simple and second branched rays subequal, so that slight elevated lobe forms anteriorly. Caudal well forked, lobes slender, pointed, and lower much longer (upper a little damaged) or about equals head length with ¾ of eye-diameter. Pectoral long, upper rays longest, fin reaches trifle beyond ventral origin. Latter inserted a little before dorsal origin, though a little nearer anal origin than that of pectoral, and depressed fin reaching anal origin. Vent about last fifth in space between ventral and anal origins.

Color when fresh in alcohol largely pale olivaceous-brown on back, with sides becoming pale or whitish, also below, and whole overshot with bright silvery-white. A broad silvery-white band extends from eye to caudal base, width about equal to eye-diameter, this conspicuously contrasting coloration of back with that of lower regions. No dark humeral blotch. At base of caudal and on contiguous region of caudal peduncle dusky blotch, this extending out on median caudal rays to edge of fin, though area on latter paler and variegated with deeper marblings. Head brownish-olive above, color including all of upper lip, also lower lip. Head sides and below, also iris, bright silver-white. Dorsal grayish basally, becoming pale olivaceous distally. Anal similar, only largely tinged with pale dusky on outer portions. Caudal grayish basally, edges of fin slightly deeper. Pectoral and ventral pale grayish, distally slightly deeper in color. Peritoneum dusky to blackish.

Length 3⅞ inches.

Type, No. 8. Collection of S. N. Rhoads. Affluent of the Chimbo River, near Bucay, Province of Guayas, Ecuador. July, 1911.

Also Nos. 9 to 16, paratypes, same data. Head $3\frac{2}{3}$ to 4; depth $2\frac{3}{5}$ to $3\frac{2}{5}$; D. III, 9; A. usually IV, 35, frequently IV, 32, or IV, 37, sometimes IV, 39; scales in l. l. usually 44 to 46, sometimes 43 or 47 + 3 or 4 more on caudal base; usually 9 scales above l. l. to dorsal origin, seldom 8; 7 scales below l. l. to ventral origin; usually 9 scales below l. l. to anal origin, seldom 8 or 10; predorsal scales 18 to 20 usually, sometimes 17 or 21; snout 4 to $4\frac{1}{4}$ in head measured from upper jaw tip; eye $2\frac{4}{7}$ to 3; maxillary $2\frac{3}{5}$ to 3; mandible $2\frac{1}{2}$ to $2\frac{7}{8}$; interorbital 3 to $3\frac{1}{4}$; pectoral $1\frac{1}{10}$ to $1\frac{1}{5}$; ventral $1\frac{3}{5}$ to $1\frac{4}{5}$; length $2\frac{7}{16}$ to $3\frac{3}{4}$ inches.

Young examples do not differ much from the adults in appearance, showing the same general coloration, though perhaps more silvery-white. They are also more elongate or slender, with a larger eye, and with very minute or obsolete maxillary teeth.

This species appears to be related to *Astyanax festæ* (Boulenger)[5] but differs in several respects. *A. festæ* has: Head 4 to $4\frac{1}{3}$, depth $2\frac{1}{2}$ to 3, eye twice length of snout or $2\frac{1}{2}$ to $2\frac{2}{3}$ in head, maxillary toothless, pectoral longer than head, and 2 blackish spots at front of l. l.

(*Νωτος*, back; *ἡμι*, half; *γωνία*, angle; *εἶδος*, appearance; with reference to the superficial resemblance to *Notemigonus*, the roach or bream of the eastern United States.)

Astyanax scierus sp. nov. Fig. 5.

Head $3\frac{3}{4}$; depth $2\frac{3}{4}$; D. III, 9; A. V, 29, I; P. I, 11; V. I, 7; scales 37 in l. l. to caudal base and 4 ? more on latter; 8 scales above l. l. to dorsal origin; 6 scales below l. l. to ventral origin; 8 scales below l. l. to anal origin; 15 predorsal scales; head width $1\frac{9}{10}$ its length; head depth at occiput $1\frac{1}{10}$; snout $3\frac{7}{8}$; eye $3\frac{2}{7}$; mandible $2\frac{2}{5}$; maxillary $2\frac{2}{5}$; interorbital $2\frac{4}{5}$; first branched dorsal ray $1\frac{1}{4}$; first branched anal ray 2; least depth of caudal peduncle $2\frac{2}{7}$; lower caudal lobe 1; pectoral $1\frac{1}{5}$; ventral $2\frac{1}{10}$.

Body elongately ovoid, well compressed, greatest depth at dorsal origin, and profiles nearly alike. Predorsal edge rounded convexly, also postdorsal. Preventral and postanal regions convex, postventral trenchant, though without distinct keel. Caudal peduncle well compressed, about long as least depth.

Head moderate, well compressed, nearly flattened sides very slightly constricted below, upper and lower surfaces convex, profiles similarly inclined and both a little convex. Snout short, convex over surface and in profile, length about $\frac{2}{3}$ its basal width. Eye circular, a little elevated, and its centre about first $\frac{3}{8}$ in head. Eyelids narrow, thin. Pupil circular. Maxillary vertically inclined, narrow, with greatest expansion about $3\frac{1}{2}$ in eye, extends back a little behind front eye edge, though not to front pupil edge. Upper lip firm, tough, lower thick, fleshy and free in front. Mouth rather small, short, commissure nearly horizontal, and powerful jaws with lower not protruding when closed. Premaxillary teeth biserial, anterior a little smaller and tricuspid, and posterior quincuspid and broad. All premaxillary teeth with convex surfaces, median cusp much largest, and edges of all denticles entire. Two small teeth on lower edge of each maxillary inside mouth. Mandibular teeth uniserial, symphyseal pair enlarged, quincuspid, others, of which 3 follow graduated slightly back on each ramus, similar. Mandibular dentition extends about half way on each ramus. No other teeth. Upper and lower buccal folds broad, especially former. Tongue a little long, depressed, rounded and not free in front. Mandible strong, convex over surface, and rami moderately elevated inside mouth. Nostrils together, close before upper front edge of eye, anterior simple pore and posterior exposed in crescent. Interorbital evenly convex. Preorbital narrow, similar to maxillary, and latter mostly slipping below its lower edge. Infraorbital

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[5] *Tetragonopterus festæ* Boulenger, *Boll. Mus. Z. Anat. Comp. Torino*, XIII, No. 329, 1898, p. 2. *Rio Vinces, Ecuador.*

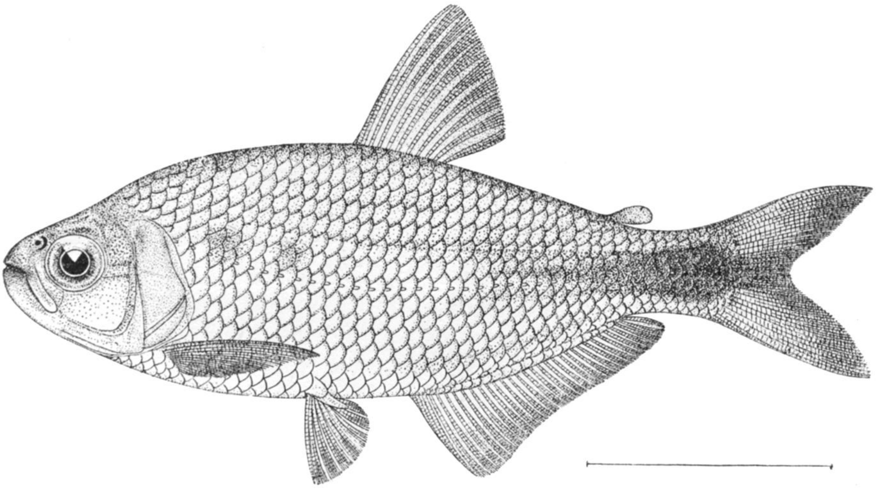

Fig. 5.—*Astyanax scierus* Fowler. Type.

covering most of cheek, larger than eye. Postorbital small, its width about 2 in eye. Opercle width about $2\frac{2}{3}$ in its depth. Hind preopercle edge nearly straight, inclined slightly posteriorly. Occipital fontanel rather broad. Head bones all smooth. Opercle membrane over gill-opening rather broad.

Gill-opening forward about opposite front eye edge. Rakers 8 + 9, lanceolate, compressed, pointed, longest about $\frac{3}{5}$ of filaments. Latter $1\frac{3}{4}$ in eye. No pseudobranchiæ. Gill-membranes largely separate, only forming short fold anteriorly over narrow and rather convex isthmus. Branchiostegals 4, strong, subequal.

Scales moderate, well exposed, in longitudinal series parallel with l. l., sometimes with many as 18 radiating striæ, edges entire and convex. Scales mostly a trifle smaller along edges of body, especially supra-anal region. Caudal base scaly, though scales a little smaller than on body. Base of anal with a row of moderately small scales. Other fins, together with head, naked. No scaly axillary pectoral flap, though that of ventral free, elongate, pointed, and about $\frac{3}{7}$ length of fin. Scales passing completely over all body edges, except apparently postanal region, though on latter no median naked strip. L. l. complete, decurved a little below median axis of body and extending a little low along caudal peduncle side up to median caudal base. Tubes simple, at first little exposed, but gradually extend till nearly over first half of scale exposures.

Dorsal origin about midway between snout tip and caudal base, first branched ray longest with second branched and third simple rays subequal, these all reaching about far back as tips of last rays, and depressed fin nearly half way to caudal base. Adipose fin inserted trifle nearer depressed dorsal tip than caudal base, fin half way to latter. Anal inserted below sixth branched dorsal ray base, first branched ray longest with second branched and fourth simple rays subequal, thus forming slightly elevated anterior lobe. Caudal well forked, lobes pointed and lower (slightly damaged) evidently a little longer. Pectoral with upper rays longest, reaches trifle beyond ventral origin. Latter inserted well before dorsal or a trifle nearer anal than pectoral origin and fin $1\frac{1}{8}$ to anal. Vent about last fourth in space between ventral and anal origins.

Color when fresh in alcohol rather dark olivaceous-brown above, paler to dull whitish below. All upper surface of body with dark or swarthy appearance, being dusted with minute dusky or blackish dots broadly over edges of scales, this also extending well down over sides or till opposite bases of pectorals. Almost all of body overshot with dull silvery reflections. Head dark olivaceous-brown like back, this color including all of upper lip and snout. Maxillary and mandible rather grayish. Sides of head and below whitish, former silvery and opercle with some golden reflections. Almost all of side of head with minute brownish dots, which a little enlarged and quite distinct on postorbital. Iris grayish-dusky, with silvery reflections. On side of body a broad underlaid plumbeous streak, ill defined and less in width than eye-diameter, extends from shoulder to caudal base. In third to fifth scales of its course a nebulous dusky blotch a little less than eye, and followed by a similar one at eighth and ninth scales. At end of plumbeous band a large dusky to blackish blotch, and this reflected out on median caudal rays to their tips. Dorsal dark gray. Caudal lobes grayish basally, becoming brownish distally. Paired fins and anal grayish, latter with membranes dull dusky on outer portions. Pectoral and ventral also slightly darker on outer portions. Adipose fin brownish. Inside gill-opening with some minute dusky dots, otherwise pale. Peritoneum silvery below.

Length $3\frac{11}{16}$ inches.

Type, No. 17. Collection of S. N. Rhoads. Affluent of the Chimbo River, near Bucay, Province of Guayas, Ecuador. July, 1911.

Also Nos. 18 to 30, paratypes, same data. Head $3\frac{3}{7}$ to $3\frac{7}{8}$; depth $2\frac{3}{5}$ to $3\frac{1}{5}$; D. iii, 9; A. usually iv, 27, i, frequently iv, 25, i, iv, 26, i, iv, 28, i, or iv, 29, i; scales in l. l. usually 35, frequently 36 or 37, sometimes 38, seldom 34 + usually 4, sometimes 3; usually 7 scales above l. l. to dorsal origin, frequently 8; 6 scales below l. l. to ventral origin; usually 7 scales below l. l. to anal origin, frequently 8, seldom 6; usually 15 predorsal scales, often 16 or 17; snout $3\frac{3}{4}$ to $4\frac{1}{4}$ in head measured from upper jaw tip; eye $2\frac{4}{5}$ to $3\frac{1}{5}$; maxillary $2\frac{1}{6}$ to $2\frac{5}{6}$; mandible $2\frac{1}{10}$ to $2\frac{2}{5}$; interorbital $2\frac{1}{3}$ to 3; pectoral $1\frac{1}{8}$ to $1\frac{1}{4}$; ventral $1\frac{2}{3}$ to 2; length $1\frac{5}{8}$ to $3\frac{1}{8}$ inches. Small examples are usually more elongate, paler or more silvery, and have the mandible slightly protruding. They show the maxillary teeth, however.

This species appears related to *Astyanax simus* (Boulenger),[6] a species originally confused with *A. mexicanus* (Philippi), as *Tetragonopterus petenensis*, by Günther. It differs in the size of head and depth of the body. Boulenger gives the former as $3\frac{2}{3}$ to 4 and the latter as 3 to $3\frac{1}{2}$. If this refers to the total length, my examples show the head $4\frac{1}{5}$ to $4\frac{7}{8}$ and the depth as $3\frac{1}{5}$ to $3\frac{4}{5}$. Further, *A. simus* is said to be without a humeral blotch, while *A. scierus* has two. *A. simus* is about $3\frac{5}{16}$ inches in length. In any case the account of *A. simus* is not in agreement with my material representing the present species.

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[6] *Tetragonopterus simus* Boulenger, *Boll. Mus. Z. Anat. Comp. Torino*, XIII, No. 329, 1898, p. 2. *Valley of Chota, north of Ecuador.*

(*Σχιερός*, dusky.)

PIABUCININÆ.

Piabucina aureoguttata sp. nov. Fig. 6.

Head 4; depth 4; D. ii, 8; A. iii, 8, i; P. i, 14; V. i, 7; 25 scales in a lateral series from shoulder to caudal base, and 4 more on latter; 8 scales between dorsal and ventral origins transversely; 14 predorsal scales; head width $1\frac{3}{4}$ its length; head depth at occiput $1\frac{1}{2}$; mandible $2\frac{2}{7}$; first branched dorsal ray 2; first branched anal ray $2\frac{1}{10}$; least depth of caudal peduncle $2\frac{2}{5}$; upper caudal lobe $1\frac{1}{10}$; pectoral $1\frac{5}{6}$; ventral 2; snout 4 in head measured from upper jaw tip; eye 6; maxillary $2\frac{3}{4}$; interorbital $2\frac{3}{5}$.

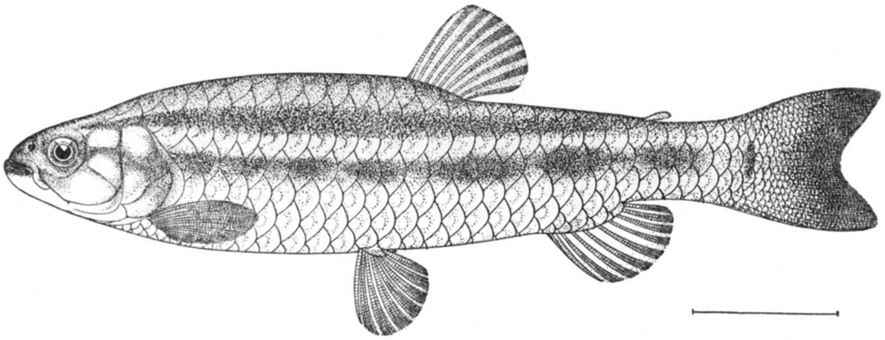

Fig. 6.—*Piabucina aureoguttata* Fowler. Type.

Body elongate, compressed, rather heavy forward, profiles similar so contour rather fusiform, greatest depth about ventral origin, and edges all broadly convex. Caudal peduncle well compressed, least depth about $1\frac{1}{8}$ its length.

Head moderate, profiles slightly convex, surfaces convex above and below, broad, and sides slightly convex. Snout convex over surface and in profile, broad, short, length about $1\frac{3}{5}$ its basal width. Eye small, rounded, but little elevated, and in profile centre about first third in head. Eyelid free, narrow. Pupil large, circular. Maxillary nearly vertical, extends back about opposite front pupil margin, its upper edge slips well below preorbital, bone notched above, and greatest distal width about $\frac{4}{7}$ of eye. Upper lip thin, tough, tight. Lower lip similar, only a little more fleshy on each side of mandible. Teeth in jaws rather small, strong, tricuspid, slightly compressed with median cusp greatly enlarged and pointed, edges of teeth otherwise entire, and all uniserial. At base of each maxillary a series of 4 small teeth, continuous with others in upper jaw, and otherwise similar. No other teeth. Upper and lower buccal folds rather broad, well developed. Tongue broad, fleshy, depressed, front edge free and convex as seen from above, surface finely papillose. Mandible strong, rami low, surface convex and anteriorly well protruding in front beyond snout tip. Nostrils together, anterior in a short cutaneous tube, forming behind into a rather broad flap, and posterior a bean-shaped aperture close behind. Interorbital broadly convex. Broad suborbital chain completely covering cheek. Preorbital narrowest of suborbital chain, and narrowest portion about half of eye. Postero-infraorbital largest, its length about twice eye-diameter. Lower postorbital larger than upper. Hind preopercle edge nearly straight and inclined a little behind. Opercle width about $1\frac{3}{4}$ its length. Hind cutaneous edge of gill-opening broad.

Gill-opening forward about opposite hind pupil edge. Rakers 8 + 12, rather slender, elongate, lanceolate, tips pointed, about $\frac{3}{5}$ of filaments. Latter $1\frac{1}{2}$ in eye. No pseudobranchiæ. Isthmus broadly convex, membranes forming narrow free fold anteriorly. Branchiostegals 4, subequal, strong.

Scales large, firm, well exposed, free edges convex, cycloid, with about 10 more or less reticulated radiating striæ over exposures, and all distributed in nearly even longitudinal series. Scales along edges of body but little smaller than others. Body scales extend out on anal base, where not much smaller than others and form a sheath into which anal fin depresses. Caudal largely scaly basally, scales at base but little smaller than others on side of body, though becoming quite small out on lobes of fin sub-basally. Pectoral with rather deep axillary depression. Ventral axilla with short and free pointed scaly flap a little less than 3 in fin. Fins otherwise, and head, naked. L. l. evident only as first 3 tubes in course from shoulder. Tubes simple, small and extend over first third in scale exposures.

Dorsal origin about midway between caudal base and hind eye edge, first and second branched rays subequal and longest, depressed fin half way to adipose fin origin. Adipose fin small, inserted a little before last fourth in space between dorsal origin and caudal base, fin less than half way to latter. Anal inserted behind depressed dorsal tip, first to third branched rays subequally longest, fin $1\frac{2}{5}$ to caudal base, lower edge rounded. Caudal broad, slightly emarginated, upper lobe a little longer than lower. Pectoral broad, rounded, $1\frac{9}{10}$ to ventral, and upper rays longest. Ventral inserted a little before dorsal origin, fin $1\frac{4}{5}$ to anal origin. Vent close before anal.

Color in alcohol rich umber-brown on back, becoming paler on sides below and lower regions, where largely whitish. From occiput along each side of back to end of upper surface of caudal peduncle a broad dusky to blackish band, this well separated from an inferior lower similar band. This latter narrow, rather ill-defined, extends back from eye across opercle along middle of side and becomes more or less obsolete after anal. It seems to be obscurely broken up into a number of blackish blotches, of which one above anal base and another below adipose fin most distinct. A narrow dusky-black vertical bar at caudal base. Almost all of scales along side below with a gilt or golden blotch at inner basal region, and these fading out after being in alcohol some time. Head brownish above, sides paler, with lower surface whitish. Lips both deep brown, maxillary but little paler. Tongue largely pale, front edge dusky. Inside gill-opening pale. Iris brownish. Dorsal grayish. Caudal pale olivaceous-brown. Other fins all pale or whitish. Peritoneum silvery-white.

Length $6\frac{3}{16}$ inches.

Type, No. 31. Collection S. N. Rhoads. Affluent of the Chimbo River, near Bucay, Province of Guayas, Ecuador. July, 1911.

This species differs from *Piabucina astrigata* Regan, and in fact all the others in the genus by its coloration.

(*Aureus*, golden; *gutta*, spot; with reference to the coloration.)

CICHLIDÆ.

Æquidens azurifer sp. nov. Fig. 7.

Head $2\frac{4}{5}$; depth $2\frac{1}{3}$; D. XIV, 11; A. III, 9, i; P. i, 13; V. I, 5; scales 16 in upper branch of l. l., 9 in lower branch; 4 scales between spinous dorsal origin and l. l.; 2 scales between rayed dorsal origin and l. l.; 6 scales obliquely back from anal origin to beginning of lower branch of l. l.; 9 predorsal scales; head width $1\frac{2}{3}$ its length; head depth at occiput 1; snout $2\frac{2}{7}$; eye $5\frac{1}{8}$; maxillary $3\frac{1}{10}$; interorbital $2\frac{5}{7}$; mandible $2\frac{2}{5}$; fourth dorsal spine $3\frac{1}{4}$; tenth dorsal spine 3; fourteenth dorsal spine $2\frac{3}{4}$; sixth branched dorsal ray $1\frac{1}{4}$; third anal spine $2\frac{2}{3}$; fifth branched anal ray $1\frac{2}{7}$; least depth of caudal peduncle $2\frac{2}{7}$; caudal $1\frac{1}{10}$; pectoral $1\frac{1}{10}$; ventral $1\frac{1}{4}$.

Body oblong, well compressed, deep, rather robust, back well elevated with upper profile bulging somewhat anteriorly, lower profile rather evenly and shallowly convex and greatest depth about opposite depressed ventral spine tip. Body edges all rounded convexly. Caudal peduncle well compressed, length about $\frac{3}{4}$ in least depth.

Head large, compressed, upper profile steeply inclined, slightly concave before eye, and lower profile little inclined. Sides of head slightly convex, becoming a little more approximated above than below. Snout large, profile slightly convex, surface well convex, and basal width at front of eyes equals its length. Eye circular, rather well elevated, close to front profile, and a little anterior in head length. Eyelid free, narrow. Pupil circular. Mouth wide, small, commissure slightly inclined. Muzzle rather prominent, somewhat protruding, and jaws equal. Premaxillary quite protractile. Maxillary narrow, extends about half way in snout length, and concealed by preorbital. Lips thick, fleshy, tough, not free, at corners of mouth somewhat conspicuous. An outer series of enlarged conic teeth in each jaw, followed by a broad inner band

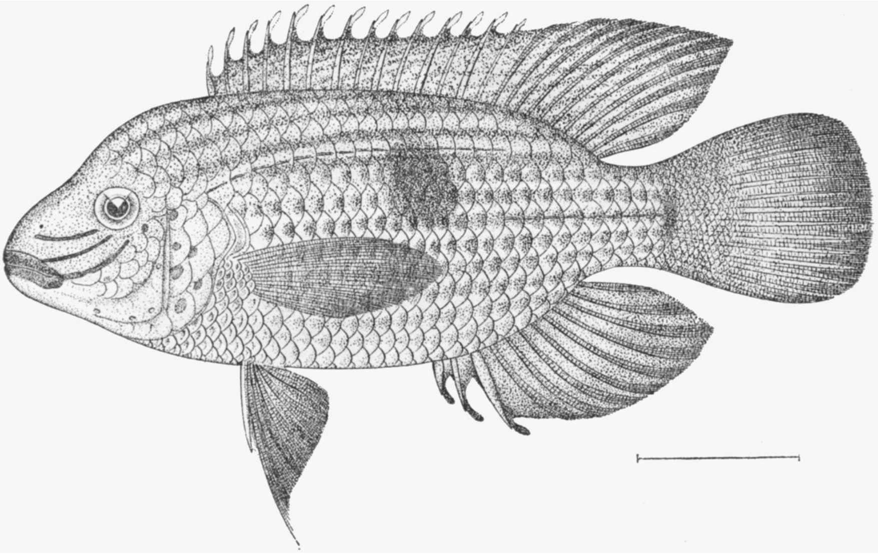

Fig. 7.—*Æquidens azurifer* Fowler. Type.

of villiform teeth. Apparently no other teeth. Upper and lower buccal folds present, upper well developed. Tongue thick, fleshy, end thickened conic tip, not free. Mandible shallow, rami low, and surface convex. Nostrils small, anterior larger, a trifle nearer eye than upper jaw end, and posterior inconspicuous opposite front eye edge medianly. Interorbital convex. Hind preopercle edge straight, nearly vertical or but slightly inclined forward. Membrane along hind edge of gill-opening narrow.

Gill-opening extends forward about midway in head. Rakers 3 + 8, short, weak, rather fleshy and rather conic, about 3 in filaments. Latter $1\frac{1}{4}$ in eye. No pseudobranchiæ. Isthmus broadly convex, membrane forming rather broad free fold across. Branchiostegals 5, rather long, narrow.

Scales rather large, well exposed, finely ctenoid, in longitudinal series, and a little smaller on breast than elsewhere on trunk. Fins scaleless, except caudal base, and that covered with numerous small scales. Head largely naked, except 3 series of scales on cheek, 3 rows on opercular region, and occipital region. No pointed axillary scaly flaps. On mandible below 4 pores on each ramus, and along each preopercular edge 4 more large pores. L. l. interrupted below front of soft dorsal, begins at shoulder and curves up till a little above eye, after which nearly straight. Lower portion of l. l. begins opposite end of upper, well below eye, straight or horizontal, and extends out on caudal base. Tubes simple, well exposed, in some cases nearly or quite to edges of scales.

Spinous dorsal inserted nearer snout tip in vertical than rayed dorsal origin, spines graduated up to fourth after which subequal to tenth, and then last graduated still a trifle longer. Edge of spinous dorsal deeply notched, tip of each spine with a well-developed cutaneous flap. Rayed dorsal with postero-median rays longest, forming an elongated point to fin, begins before end of upper l. l. or beginning of lower l. l., and edge entire. Anal with spinous origin about opposite twelfth dorsal spine base, spines graduated up to last, which longest, membranes notched, and tip of each spine with a well-developed free cutaneous flap. Rayed anal like rayed dorsal, and origin of fin about opposite that of rayed dorsal, with postero-median rays longest, and edge entire. Caudal with hind margin convex, median rays longest. Pectoral large, long, fin reaches opposite second anal spine base, superior rays longest. Ventral origin a little behind that of pectoral, fin pointed, reaches anal origin, spine strong and about 2 in fin. Vent close before anal.

Color in alcohol largely olivaceous-brown on back, becoming paler below and on sides. On lower surface color pale gray-brown, much paler on lower surface of head, and on breast about gill-opening. Along each series of scales on back at upper and lower junctions of scales longitudinal or horizontal dark lines. These latter at first dusky or deep slaty-brown, but as they follow below upper l. l. become pale blue, so that over greater or lower half of trunk they have this tint. Along middle of side opposite hind end of depressed pectoral, just below and partly on upper l. l. a large slaty-black blotch, but it also perforated by regular slaty longitudinal streaks, giving an underlaid appearance. This dark slaty-black blotch formed only as broad dark edges to scales involved, and even olivaceous streaks also showing in the interstices. Along costal region, and that above spinous anal, pale blue streaks become connected at bases of scales and thus expose olivaceous ground-color as rounded spots, one on each scale. These pale blue streaks extend completely along caudal peduncle side to base of caudal. Head olivaceous-brown above, like back, becoming paler below. Lips brownish, cheek and opercular region with pale gray spot. Two deep blue narrow lines extend down from lower edge of eye to lower preorbital edge, and an upper parallel and similar extends towards snout tip till just below front nostril. Iris slaty. Inside gill-opening pale. Spinous dorsal and rayed dorsal dull olive-dusky, with indistinctly defined oblique streaks more or less longitudinally, also somewhat reticulated in places, with grayish. Upper edge of rayed dorsal narrowly, and cutaneous tips to dorsal spines dull ochraceous. Caudal dull olivaceous-brown, clouded indistinctly with dusky as several irregular darker transverse streaks. Edge of caudal behind narrowly dull ochraceous. Anal dull olivaceous, with grayish tinge basally and dull dusky distally, edge becoming narrowly slaty. Bases of rayed vertical fins, together with bases of last dorsal and anal spines with dull or pale bluish tinge. A short vertical dusky or slaty bar at caudal base. Pectoral and ventral pale brownish-gray, both pale basally, former more brownish distally and latter becoming dusky distally along first and second branched rays.

Length $5\frac{1}{4}$ inches.

Type, No. 32. Collection, S. N. Rhoads. Affluent of the Chimbo River, near Bucay, Province of Guayas, Ecuador. July, 1911.

Also Nos. 33 to 35, paratypes, same data. Head $2\frac{2}{3}$ to $2\frac{9}{10}$; depth $2\frac{2}{7}$ to $2\frac{2}{5}$; D. usually XIV spines, sometimes XIII, rays usually 11, sometimes 10; A. spines III, rays usually 9, sometimes 8; scales in upper branch of l. l. usually 16, sometimes 17; scales in lower branch of l. l. 7 to 10 to caudal base, and 2 more on latter (with tubes); 4 scales above upper branch of l. l. to spinous dorsal origin; 5 scales below lower branch of l. l. to spinous anal origin; usually 9 predorsal scales, sometimes 8; left gill-rakers 2 + usually 9, sometimes 10; right gill-rakers usually 2, sometimes 3 + usually 9, sometimes 10; snout 2 to 3 in head; eye $3\frac{2}{7}$ to $4\frac{1}{4}$; maxillary $3\frac{2}{5}$ to 4; interorbital $2\frac{2}{3}$ to 3; length $2\frac{1}{2}$ to $4\frac{1}{4}$ inches. Some variation is noticed in these examples, but mostly in the smallest. Though it also has the coloration with the six broad dark transverse bands distinct, these are not very evident in the type. In all, the fourth to tenth dorsal spines are more or less equal, and not regularly graduated from the anterior to the last.

This species is close to *Æquidens rivulatus* (Günther), but differs in several respects when examples of similar size are compared. According to Regan,[7] *Æ. rivulatus* has the head 3; eye $3\frac{2}{3}$ to 4, interorbital 3 to $3\frac{1}{4}$, 7 or 8 rakers on lower part of gill-arch, dorsal spines increasing in length to last, longest dorsal rays extend back to middle or beyond in caudal length, caudal peduncle long or nearly long as deep, a blackish vertical stripe below eye, 3 blue lines from eye to maxillary, etc.

(*Azureus*, blue; *fero*, to bear; with reference to the pale bluish in the coloration.)

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[7] *Acara rivulata* Regan, *Ann. Mag. Nat. Hist.*, (7) XV, 1905, p. 338 (type). *Rio Peripa, W. Ecuador.*

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